

REMARKS

Status of Claims

Claims 11-29 are pending, of which claims 22-29 have been withdrawn due to a restriction requirement.

Claims 11 and 16-21 have been amended to correct informalities in the claim language and to more clearly define the claimed subject matter. Support for the amendments is found, for example, at paragraphs [0018] and [0032] of the specification. No new matter has been entered.

Objection to the Specification

The Examiner objected to the specification because of the minor informalities. Applicants respectfully submit that the amendments made to the specification overcome this objection.

Rejection under 35 U.S.C. § 112, second paragraph

Claims 11-21 were are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Applicants respectfully submit that the amendment made to these claims overcome this rejection regarding the antecedent basis issue raised by the Examiner.

Rejection under 35 U.S.C. § 102

Claims 11-13 and 17-18 were rejected under 35 U.S.C. § 102(b) as being anticipated by Nilsson et al. (US 5,681,783). Applicants respectfully traverse this rejection for at least the following reasons.

Applicants respectfully submit that amended claim 11 now recites “a structure comprising tungsten as a main component and tungsten carbide, wherein content of the tungsten is at least 50% by mass.” As disclosed at paragraph [0018] of the specification, the term “containing as a main component” means that the structure constitutes the material, i.e., tungsten, at least 50% by mass of the structure. In the present application, the amount of tungsten atoms included in the tungsten carbide is not considered as the content of the tungsten.

Applicants submit that Nilsson fails to disclose this limitation of claim 11. In Nilsson, the main component of the material is tungsten carbide, not tungsten. The material of Nilsson is made of mixture of tungsten (W) and tungsten carbide (WC) and the tungsten carbide is contained as W_xC ($1 < x < 2$) in the material (see, abstract and EXAMPLES of Nilsson). Further, the content of carbon (tungsten bonded) is at most 6.05 wt% and at least 5.0 wt% (see, col. 4, lines 23-46 of Nilsson). From these numbers, ignoring other elements, the content of W in the material of Nilsson is about 1.3 – 18.4 wt% when the material includes WC according to the following calculation:

Atomic weight of Carbon: 12

Weight of WC: 195.82

Weight of W_2C : 379.7

The content of W: w %

The content of WC: $100 - w$ %

The content of Carbon for WC: $12/195.82 \times (100 - w) = 5 \sim 6.05$ wt%.

Then, the content of W can be calculated as 1.3 ~ 18.4 wt% for WC. Conversely, if the material of Nilsson contained 50% by mass of W and 50% by mass of WC (or W_2C), the content of carbon would be about 3.16% for WC or 2.13% for W_2C , which are out of the range required by Nilsson.

In fact, Nilsson uses, for example, 15g of W and 485g of WC or 30g of W and 485g of WC for Examples 1-16 (see, col. 13, line 66 to col. 14, line 7 of Nilsson), which would very unlikely yield a W content of at least 50% by mass in the final material.

As such, it is clear that, at a minimum, Nilsson fails to disclose the above discussed limitation of claim 11 regarding the amount of tungsten. Accordingly, claim 11 and dependent claims 12-13 and 17-18 are patentable over Nilsson.

Rejection under 35 U.S.C. § 103(a)

Claims 11-13 and 16 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Okuda et al. (US 5,106,674). Claims 15-16 and 20-21 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Nilsson et al. Claims 14 and 19 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Nilsson et al. with evidence from Rota et al. (Micro powder metallurgy for the replicative production of metallic microstructures). Applicants respectfully traverse these rejections for at least the following reasons.

Regarding claim 11, Applicants respectfully submit that Okuda discloses a blade member of tungsten carbide as a main component, but fails to disclose a structure comprising tungsten as a main component and tungsten carbide, wherein content of the tungsten is at least 50% by mass as recited by claim 11. In Okuda, tungsten is used in the form of carbide or carbo-nitride (see, col. 2, lines 25-28 of Okuda) and thus fails to disclose the claimed amount of tungsten. As such, it is clear that Okuda does not render claim 11 and any dependent claims 12-13 and 16 thereupon obvious. Thus, it is requested that the Examiner withdraw the rejection of claims 11-13 and 16 based on Okuda.

Regarding claims 15-16 and 20-21, as discussed above, Nilsson fails to disclose the limitations of base claim 11. As such, it is clear that Nilsson does not render claims 15-16 and 20-21 obvious. Thus, it is requested that the Examiner withdraw the rejection of claims 15-16 and 20-21 based on Nilsson.

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Regarding claims 14 and 19, as discussed above, Nilsson fails to disclose the limitations of base claim 11. Rota does not cure the deficiencies of Nilsson because Rota merely mentions tungsten carbide cobalt. As such, it is clear that claims 14 and 19 are patentable over Nilsson and Rota. Thus, it is requested that the Examiner withdraw the rejection of claims 14 and 19 based on Nilsson and Rota.

CONCLUSION

Having fully responded to all matters raised in the Office Action, Applicants submit that all claims are in condition for allowance, an indication for which is respectfully solicited. If there are any outstanding issues that might be resolved by an interview or an Examiner's amendment, the Examiner is requested to call Applicants' attorney at the telephone number shown below.

To the extent necessary, a petition for an extension of time under 37 C.F.R. § 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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